

SECTION 12 36 00

COUNTERTOPS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies casework countertops with integral accessories.
- B. Integral accessories include:
 - 1. Sinks with traps and drains.

1.2 RELATED WORK

- A. Color and patterns of plastic laminate: Refer to Finish Designations in Drawings.
- B. DIVISION 22, PLUMBING.
- C. DIVISION 26, ELECTRICAL.
- D. Equipment Reference Manual for SECTION 12 36 00, COUNTERTOPS.

1.3 SUBMITTALS

- A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings
 - 1. Show dimensions of section and method of assembly.
 - 2. Show details of construction at 1/2 scale.
- C. Samples:
 - 1. 150 mm (6 inch) square samples each top.
 - 2. Front edge, back splash, end splash and core with surface material and booking.

1.4 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Hardboard Association (AHA):
 - A135.4-95.....Basic Hardboard
- C. Composite Panel Association (CPA):
 - A208.1-09.....Particleboard
- D. American Society of Mechanical Engineers (ASME):
 - A112.18.1-12.....Plumbing Supply Fittings
 - A112.1.2-12.....Air Gaps in Plumbing System
 - A112.19.3-08(R2004)..Stainless Steel Plumbing Fixtures (Designed for Residential Use)
- E. American Society for Testing and Materials (ASTM):
 - A167-99 (R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
 - A1008-10.....Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength, Low Alloy
 - D256-10.....Pendulum Impact Resistance of Plastic
 - D570-98(R2005).....Water Absorption of Plastics
 - D638-10.....Tensile Properties of Plastics

- D785-08.....Rockwell Hardness of Plastics and Electrical
Insulating Materials
- D790-10.....Flexural Properties of Unreinforced and
Reinforced Plastics and Electrical Insulating
Materials
- D4690-99(2005).....Urea-Formaldehyde Resin Adhesives
- F. Federal Specifications (FS):
- A-A-1936.....Adhesive, Contact, Neoprene Rubber
- G. U.S. Department of Commerce, Product Standards (PS):
- PS 1-95.....Construction and Industrial Plywood
- H. National Electrical Manufacturers Association (NEMA):
- LD 3-05.....High Pressure Decorative Laminates

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Plastic Laminate: NEMA LD 3.
1. Concealed backing sheet Type BKL.
 2. Decorative surfaces:
 - a. Flat components: Type GP-HGL.
 - b. Post forming: Type PF-HGP.
 3. Chemical Resistant Surfaces
 - a. Flat components: Type GP-HGL.
 - b. Post forming: Type PF-HGP.
 - c. Resistance to reagents:
 - 1) Test with five 0.25 mil drops remaining on surface for 16 hours followed by washing off with tap water, then cleaned with liquid soap and water, dried with soft cotton cloth and then cleaned with naphtha.
 - 2) No change in color, surface texture, and original protectability remaining from test results of following reagents:

| | | |
|-----------------------------|---------------|-------------------|
| 98% Acetic Acid | Butyl Alcohol | Acetone |
| 90% Formic Acid | Benzine | Chloroform |
| 28% Ammonium Hydroxide | Xylene | Carbon |
| Tetrachloride | | |
| Zinc Chloride (Sat.) | Toluene | Cresol |
| Sodium Carbonate (Sat.) | Gasoline | Ether |
| Calcium Hypochlorite (Sat.) | Kerosene | Cottonseed |
| Oil | | |
| Sodium Chloride (Sat.) | Mineral Oil | |
| 40%Formaldehyde | | |
| Methyl Alcohol | Ethyl Acetate | |
| Trichlorethylene | | |
| Ethyl Alcohol | Amyl Acetate | Monochlorobenzine |
 - 3) Superficial effects only: Slight color change, spot, or residue only with original protectability remaining from test results of following reagents:

| | | |
|---------------------|-----------------------|----------|
| 77% Sulfuric Acid | 37% Hydrochloric Acid | |
| 85% Phenol | | |
| 33% Sulfuric Acid | 20% Nitric Acid | Furfural |
| 85% Phosphoric Acid | 30% Nitric Acid | Dioxane |

4) Minimum height of impact resistance: 300 mm (12 inches).

Molded Resin:

1. Non-glare epoxy resin or furan resin compounded and cured for minimum physical properties specified:

| | | |
|-------------------------------------|---------------------|-----------|
| Flexural strength | 70 MPa (10,000 psi) | ASTM D790 |
| Rockwell hardness | 105 | ASTM D785 |
| Water absorption, 14 hours (weight) | .01% | ASTM D570 |

2. Material of uniform mixture throughout.

- B. Stainless Steel: ASTM A167, Type 304.
- C. Sheet Steel: ASTM A1008, cold rolled, Class 1 finish, stretcher leveled.
- D. Particleboard: CPA A208.1, Grade 2-M-2.
- E. Plywood: PS 1, Exterior type, veneer grade AC not less than five ply construction.
- F. Hardwood Countertop: Solid maple, clear grade except where other wise specified.
- G. Hardboard: ANSI/AHA A135.4, Type I, tempered, fire retardant treated, smooth surface one side.
- H. Adhesive
 1. For plastic laminate FS A-A-1936.
 2. For wood products: ASTM D4690, unextended urea resin or unextended melamine resin, phenol resin, or resorcinol resin.
 3. For Field Joints:
 - a. Epoxy type, resistant to chemicals as specified for plastic laminate laboratory surfaces.
 - b. Fungi resistant: ASTM G-21, rating of 0.
- I. Fasteners:
 1. Metals used for welding same metal as materials joined.
 2. Use studs, bolts, spaces, threaded rods with nuts or screws suitable for materials being joined with metal splice plates, channels or other supporting shape.
- J. Solid Polymer Material:
 1. Filled Methyl Methacrylic Polymer.
 2. Performance properties required:

| Property | Result | Test |
|----------------------------------|---|---|
| Elongation | 0.3% min. | ASTM D638 |
| Hardness | 90 Rockwell M | ASTM D785 |
| Gloss (600 Gordon) | 5-20 | NEMA LD3.1 |
| Color stability | No change | NEMA LD3 except 200 hour |
| Abrasion resistance | No loss of pattern Max wear depth 0.0762 mm (0.003 in) - 10000 cycles | NEMA LD3 |
| Water absorption weight (5 max) | 24 hours 0.9 | ASTM D570 |
| Izod impact | 14 N·m/m (0.25 ft-lb/in) | ASTM D256 (Method A) |
| Impact resistance | No fracture | NEMA LD-3 900 mm (36") drop 1 kg (2 lb.) ball |
| Boiling water surface resistance | No visible change | NEMA LD3 |
| High temperature resistance | Slight surface dulling | NEMA LD3 |

3. Cast into sheet form and bowl form.
4. Color throughout with subtle veining through thickness.
5. Joint adhesive and sealer: Manufacturer's silicone adhesive and sealant for joining methyl methacrylic polymer sheet.
6. Bio-based products will be preferred.

K. Laminar Flow Control Device

1. Smooth bright stainless steel or satin finish, chrome plated metal laminar flow device shall provide non-aeration, clear, coherent laminar flow that will not splash in basin. Device shall also have a flow control restrictor and have vandal resistant housing.
2. Flow Control Restrictor:
 - a. Capable of restricting flow of 7.5 to 8.5 Lpm (2.0 to 2.2 gpm) for sinks provided in paragraph 2.2D.
 - b. Compensates for pressure fluctuation maintaining flow rate specified above within 10 percent between 175 and 550 kPa (25 and 80 psi).
 - c. Operates by expansion and contraction, eliminates mineral/sediment building up with self clearing action, and is capable of easy manual cleaning.

2.2 SINKS

A. Molded Resin:

1. Cast or molded in one piece with interior corners 25 mm (one inch) minimum radius.
2. Minimum thickness of sides and ends 13 mm (1/2 inch), bottom 16 mm (5/8 inch).
3. Molded resin outlet for drain and standpipe overflow.
4. Provide clamping collar permitting connection to 38 mm (1-1/2 inch) or 50 mm (2 inch) waste outlet and trap, making sealed but not permanent connection.

- B. Stainless Steel:
 - 1. ANSI/ASME A112.19.3, Type 304.
 - 2. Self rim for plastic laminate or similar tops with concealed fasteners.
 - 3. Flat rim for welded into stainless steel tops.
 - 4. Ledge back or ledge sides with holes to receive required fixtures when mounted on countertop.
 - 5. Apply fire resistant sound deadening material to underside.
- C. Stainless steel circular or oval shaped bowl.
- D. Sinks of Methyl Methacrylic Polymer:
 - 1. Minimum 19 mm (3/4 inch) thick, cast into bowl shape with overflow to drain.
 - 2. Provide for underhung installation to countertop.
 - 3. Provide openings for drain.

2.3 ELECTRICAL RECEPTACLES

- A. Hospital grade per electrical specifications.
- B. Curb Mounted Receptacles:
 - 1. NEMA 5-20R duplex in galvanized steel box.
 - 2. Chromium plated brass or steel face plate.
- C. Pedestal Mounted Receptacles:
 - 1. NEMA 5-20R duplex installed in double faces.
 - 2. Polished stainless steel or aluminum, or chromium plated brass pedestal.

2.4 COUNTERTOPS

- A. Fabricate in largest sections practicable.
- B. Fabricate with joints flush on top surface.
- C. Fabricate countertops to overhang front of cabinets and end of assemblies 25 mm (one inch) except where against walls or cabinets.
- D. Provide 1 mm (0.039 inch) thick metal plate connectors or fastening devices (except epoxy resin tops).
- E. Join edges in a chemical resistant waterproof cement or epoxy cement, except weld metal tops.
- F. Fabricate with end splashes where against walls or cabinets.
- G. Splash Backs and End Splashes:
 - 1. Not less than 19 mm (3/4 inch) thick.
 - 2. Height 100 mm (4 inches) unless noted otherwise.
 - 3. Laboratories and pharmacy heights or where fixtures or outlets occur: Not less than 150 mm (6 inches) unless noted otherwise.
 - 4. Fabricate epoxy splash back in maximum lengths practical of the same material.
- H. Drill or cutout for sinks, and penetrations.
 - 1. Accurately cut for size of penetration.
 - 2. Cutout for VL 81 photographic enlarger cabinet.
 - a. Finish cutout to fit flush with vertical side of cabinet, allowing adjustable shelf to fit into cutout space of cabinet at counter top level. Finish cutout surface as an exposed edge.
 - b. Provide braces under enlarger space to support not less than 45 kg (100 pounds) centered on opening side along backsplash.

I. Plastic Laminate Countertops:

1. Fabricate plastic laminate on five-ply plywood or particleboard core 19 mm (3/4 inch) thick with plastic laminate backing sheet.
2. Front edge over cabinets not less than 38 mm (1-1/2 inches) thick except where plastic "T" insert is used, not less than 19 mm (3/4 inch) thick.
3. Exposed Surface and edges of decorative laminated plastic or laboratory chemical resistant surface.
 - a. Use chemical resistant surface on tops 6A, 6B, and 6C.
 - b. Use decorative surface tops when noted plastic laminate, for tops 10A, 10B and 10C.

J. Metal Counter Tops:

1. Fabricate up to 3600 mm (12 feet) long in one piece, including nosing, backs and ends.
2. When counter tops exceed 3600 mm (12 feet) in length accurately fitted field joints are acceptable.
3. Finish thickness at edges 32 mm (1-1/4 inch).
4. Reinforced with minimum 1.5 mm (0.0598 inch) thick hat channel stiffeners, minimum of two stiffeners for units without sinks and three stiffeners for units with sinks welded or soldered to underside of top full length, except at sink openings.
5. Apply sound deadening material on underside.
6. Flange edges of tops down 32 mm (1-1/4 inch) and reinforce with concealed hardwood or with a steel frame.
7. Grind welds smooth and finished on exposed surfaces to match finish specified.
8. Stainless Steel Counter or Sink Tops:
 - a. Where noted stainless steel except where specified for nourishment unit, unit kitchen, and medicine cabinet.
 - b. Use 1.5 mm (0.0598 inch) thick stainless steel.
 - c. Depth of splash backs and splash ends 25 mm (one inch) and turned down at least 13 mm (1/2 inch) at wall. Where faucets are located in splash backs, fabricate depth of splash backs 50 mm (2 inches) with provision made to receive required fixture.
 - d. Where sinks occur fabricate top with 5 mm (3/16 inch) marine edge and fit flush with adjacent tops of other materials.
 - e. Weld sink flush to counter top and finish to appear seamless.

K. Molded Resin Tops:

1. Molded resin with drip groove cut on underside of overhanging edge.
2. Finish thickness of top minimum 25 mm (1 inch).
3. Joints: Epoxy Type.
4. Secure reagent shelves to counter tops with fasteners from underside and seal seam.

L. Maple tops:

1. Fabricate in one piece of solid laminated tongue and groove maple strips, not more than three inches in width, glued under pressure to a thickness 45 mm (1-3/4 inches).
2. Edges and ends of clear maple wood. Make splash backs and splash ends of 19 mm (3/4 inch) thick maple and secure to counter tops with concealed metal fasteners and with contact surfaces set in waterproof glue.
3. Round exposed edges of maple tops and backs to approximate 9 mm (3/8 inch) radius.

4. Sand exposed surfaces smooth and even and apply two coats of boiled linseed oil. Rub in each coat and allow 48 hours to lapse between coats.
- M. Laboratory Shelf 200 mm (8 inches) deep: Fabricate of 27 mm (1-1/16 inch) thick hardwood. Finish with black acid resisting enamel.
- N. Laboratory Shelf with Funnel and Graduate Rack 300 mm (12 inches) deep shelf: Fabricate of 27 mm (1-1/16 inch) thick hardwood. Finish with black acid resisting enamel.
- O. Laboratory Shelf 254 mm (10 inch deep): Fabricate of corrosion resisting steel.
- P. Pegboards:
 1. Pegboard: Fabricate of birch with black acid resisting finish and equip with polypropylene or unfinished hardwood pegs.
 2. Pegboard with Funnel and Graduate Rack: Fabricate of birch with black acid resisting finish and equip with polypropylene or unfinished hardwood pegs. Support rack on steel brackets. Provide CRS gutter and drain to sink.
- Q. Methyl Methacrylic Polymer Tops:
 1. Fabricate countertop of methyl methacrylic polymer cast sheet, 19 mm (3/4 inch) thick.
 2. Fabricate back splash and end splash to height shown.
 3. Fabricate skirt to depth shown.
 4. Fabricate with marine edge where sinks occur.
 5. Fabricate in one piece for full length from corner to corner up to 3600 mm (12 feet).
 6. Join pieces with adhesive sealant.
 7. Cut out countertop for lavatories, plumbing trim.
 8. Provide concealed fasteners and epoxy cement for anchorage of sinks to countertop.
- R. Counter Tops for Interchangeable Furniture: Counter tops, unless otherwise shown, are to be capable of vertical adjustment of 150 mm (6 inches). Fabricate tops, except CRS, in increments of units over which they fit with maximum length not to exceed 1950 mm (78 inches). Top section shall cover as many cabinet units as possible. Horizontal joints in counter tops at service strip and across depth of counter are to be watertight when in place but of a type that can be easily separated and reset when counter top is moved up or down. Fabricate CRS tops in maximum lengths practicable, with field joints welded and ground smooth to match adjacent surfaces. Securely fasten to supporting rails with heavy metal fastening devices, or with screws, through pierced slots in such rails. Fabricate vertical splash back and reagent shelf in maximum length practicable of same material as working surface, except finish thickness shall be 19 mm (3/4 inch).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Before installing countertops verify that wall surfaces have been finished as specified and that mechanical and electrical service locations are as required.
- B. Secure countertops to supporting rails of cabinets with metal fastening devices, or screws through pierced slots in rails.
 1. Where type, size or spacing of fastenings is not shown or specified, submit shop drawings showing proposed fastenings and method of installation.

2. Use round head bolts or screws.
 3. Use epoxy or silicone to fasten the epoxy resin countertops to the cabinets.
 4. Use wood or sheet metal screws for wood or plastic laminate tops; minimum penetration into top 16 mm (5/8 inch), screw size No 8, or 10.
- C. Rubber Moldings:
1. Where shown install molding with butt joints in horizontal runs and mitered joints at corners where ceramic tile occurs omit molding.
 2. Fasten molding to wall and to splashbacks and splashends with adhesive.
- D. Sinks
1. Install stainless steel sink in plastic laminate tops with epoxy compound to form watertight seal under shelf rim.
 - a. In laboratory and pharmacy fit stainless steel sink with overflow standpipe.
 - b. Install faucets and fittings on sink ledges with watertight seals where shown.
 2. Install molded resin sinks with epoxy compound to form watertight seal with underside of molded resin top.
 - a. Install sink with not less than two channel supports with threaded rods and nuts at each end, expansion bolted to molded resin top.
 - b. Design support for a twice the full sink weight.
 - c. Install with overflow standpipes.
 3. Install methyl methacrylic polymer sinks in manufacturer's recommended adhesive sealer or epoxy compound to underside of methyl methacrylic polymer countertop.
 - a. Bolt or screw to countertop to prevent separation of bowl and fracture of adhesive sealant joint.
 - b. Install drain and traps to sink.
- E. Faucets, Fixtures, and Outlets:
1. Seal opening between fixture and top.
 2. Secure to top with manufacturers standard fittings.
- F. Range Tops, Electrical Outlets, Film Viewer:
1. Set in cutouts with manufacturer's gasket sealing joint with top to prevent water leakage.
 2. Install control unit and electric outlets where shown. Seal escutcheon plate at lap if on counter or top to prevent water leakage.

3.2 PROTECTION AND CLEANING

- A. Tightly cover and protect against dirt, water, and chemical or mechanical injury.
- B. Clean at completion of work.

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